
QPC192 Off-Premise Extension (OPX) Analog Line Card

Introduction

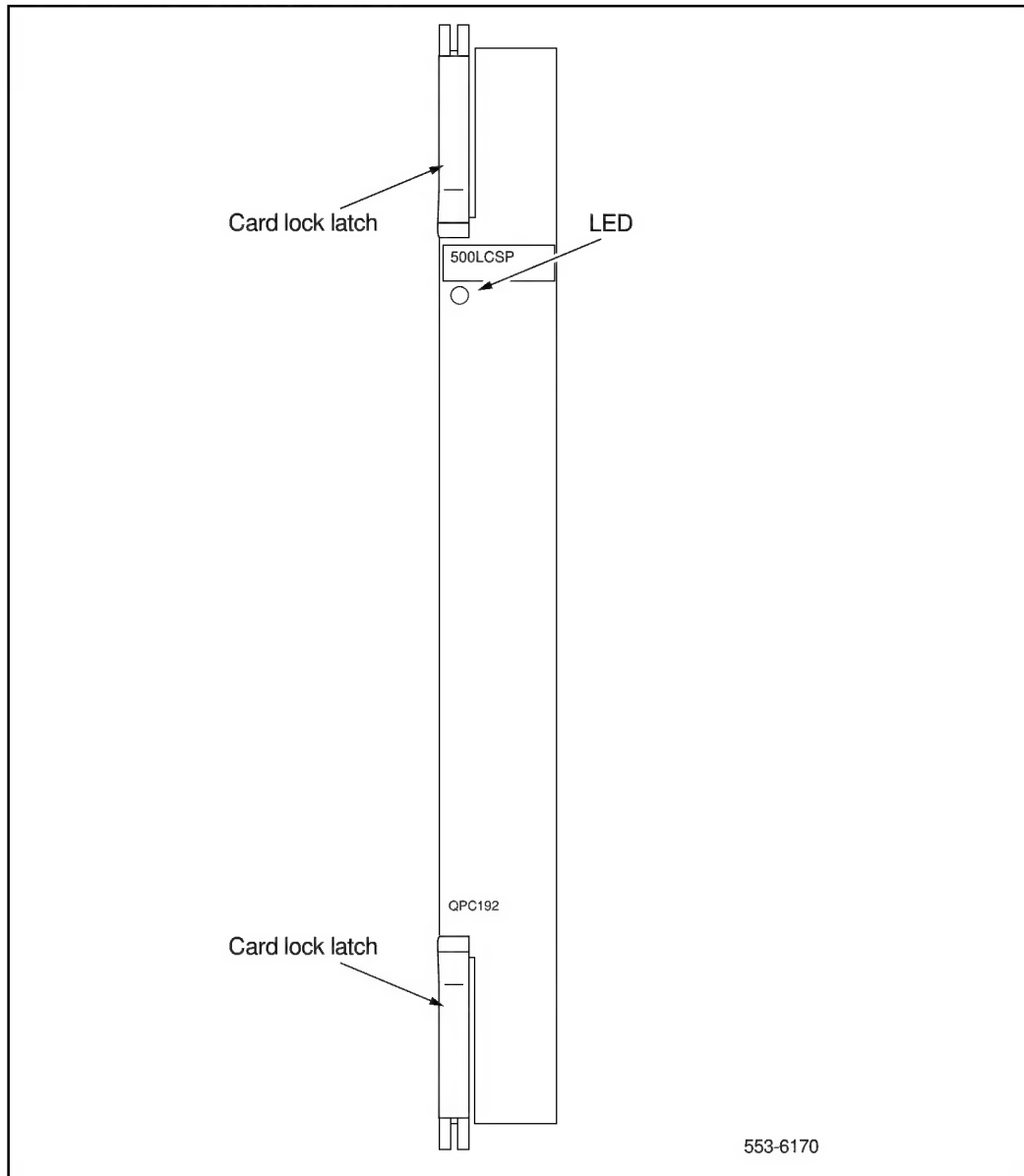
The QPC192 Off-Premise Extension (OPX) Analog Line Card is a peripheral equipment (PE) device that may be installed in any peripheral shelf or NT8D13 Peripheral Equipment (PE) Module (see [Figure 42](#)). The OPX analog line card interfaces four analog telephone lines with hazardous and surge voltage protection to the Meridian 1 switch. Each line interface is independently configurable by software control in the Single-line Telephone Administration program (LD 10).

Physical description

The OPX analog line card mounts in any peripheral equipment (PE) slot. The line interface and common multiplexing circuitry is mounted on a 31.75 cm. by 25.40 cm. (12.5 in. by 10 in.) printed circuit board.

The OPX analog line card connects to the PE backplane through an 80-pin bus system on the backplane. In a PE shelf, the bus lines feed into seven multi-pin connectors that link the line cards to the main distribution frame (MDF), also called the cross-connect terminal. In the NT8D13 PE Module the backplane connector is cabled to the input/output (I/O) panel that is linked to the MDF through 25-pair cables. Telephone lines from station equipment cross connect to the OPX analog line card at the MDF using a wiring plan similar to that used for trunk cards. See *Meridian 1 system installation procedures* (553-3001-210) for termination and cross-connect information.

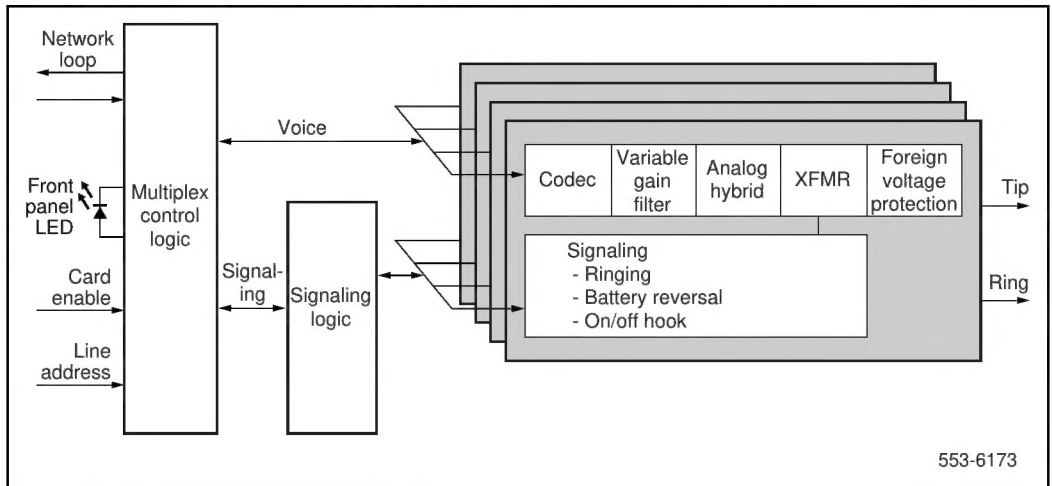
Figure 40
OPX analog line card—faceplate



Functional description

Figure 41 shows a block diagram of the major functions contained on the Off-Premise Extension (OPX) Analog Line Card. Each of these functions are described on the following pages.

Figure 41
OPX analog line card—block diagram



Card interfaces

The OPX analog line card passes voice and signaling data over network loops. This interface is discussed in detail in “Peripheral equipment” on page 23.

Line interface units

The OPX analog line card contains four identical and individually configurable line interface units (also referred to as circuits). Each unit provides 600 Ω or 900 Ω impedance matching and a balancing network in a signal transformer/analog hybrid circuit. This balancing network also contains circuitry that allows conversion from a 2-wire to a 4-wire transmission path.

Relays are provided in each unit to apply ringing onto the line, and the timing of the application of ringing current is controlled to prevent switching during current peaks. Signal detection circuits monitor on hook/off hook signaling.

Codecs

Each line interface unit contains a filter and a coder/decoder (codec). Audio signals received from the telephone line are passed through a low-pass monolithic A/D filter that limits the frequency spread of the input signal to a nominal 200–3400 Hz bandwidth. The audio signal is then applied to the input of the codec. Audio signals coming from the codec are passed through a low-pass D/A monolithic filter that integrates the amplitude modulated pulses coming from the codec and then filters and amplifies the result.

Each channel contains a codec that performs A/D and D/A conversion of the line analog voiceband signal to a digital PCM signal. The codec also contains a switchable pad for control of transmission loss. This pad can be controlled in software, and the possible gain settings are shown in [Table 44](#).

Table 44
OPX analog line card—switchable pad gain settings

Connection	Gain
OPX to OPX Connection	±1 dB
Line to OPX Connection	±1 dB
OPX to Line Connection	±1 dB

Multiplex control

The multiplex control logic is common to all four channels. This logic interfaces the individual line circuits to the peripheral bus signaling channel. Circuits are provided in the multiplex control logic to retime the digital signals received from the peripheral bus. Circuits are also provided to decode the address information contained on the peripheral bus to enable the individual line circuits during their selected time slots. Further, logic is provided to enable or disable the front panel LED to indicate the service state of the card.

Electrical specifications

This section lists the electrical characteristics of the OPX analog line card.

Analog line interface

[Table 45](#) shows the electrical characteristics of the analog line interface.

Table 45
OPX analog line card—line interface unit electrical characteristics

Characteristic	Specification
Terminal impedance (TIMP)	600 or 900 ohms
Balance impedance (BIMP)	600 or 900 ohms
DC signaling loop length (max) with five ringers	750-ohm loop (excluding resistance of telephone set) with nominal battery of –48 V dc
DC signaling loop length (max) with one ringer	1400-ohm loop (excluding resistance of telephone set) with nominal battery of –48 V dc
Battery supply voltage	–2 to –52.5 V dc
Minimum detected loop current	20 mA
Line leakage	≥ 30k ohms, tip-to-ring, tip-to-ground, ring-to-ground
Ring Trip	During silent or ringing intervals
Signaling	Loop start
Insertion Loss	5, ±1 dB at 1020 Hz

Power requirements

[Table 46](#) shows the maximum current that the QPC192 OPX line card requires from each power supply.

Table 46
OPX analog line card—power requirements

Voltage	Idle current (mA)	Active current (mA)
2.5 V, $\pm 0.5\%$	< 0.1	< 0.1
+6 V, $\pm 1\%$	50	140
−6 V, $\pm 1\%$	50	140
−48 V, $\pm 3\%$	1	320
−52 V, $\pm 4\%$	1	85

Foreign and surge voltage protections

In-circuit protection against power line crosses or lightning is not provided on the OPX line card earlier than vintage QPC192C. When a card earlier than vintage C is used to service off-premise telephones, primary and secondary MDF protection must be installed. Details on installing protection devices are given in “Off-premise line protection” on page 48. Off-premise telephones served by cable pairs routed through the central office, or crossing a public right-of-way, can be subject to a requirement for on-card protection, and MDF protectors may not be acceptable. Check local regulations before providing such service.

Environmental specifications

[Table 47](#) lists the environmental specifications for the analog line card.

Table 47
OPX analog line card—environmental specifications

Parameter	Specifications
Operating temperature	0° to +60° C (+32 to +140° F), ambient
Operating humidity	5 to 95% RH (noncondensing)
Storage temperature	–40° to +70° C (–40° to +158° F)

Connector pin assignments

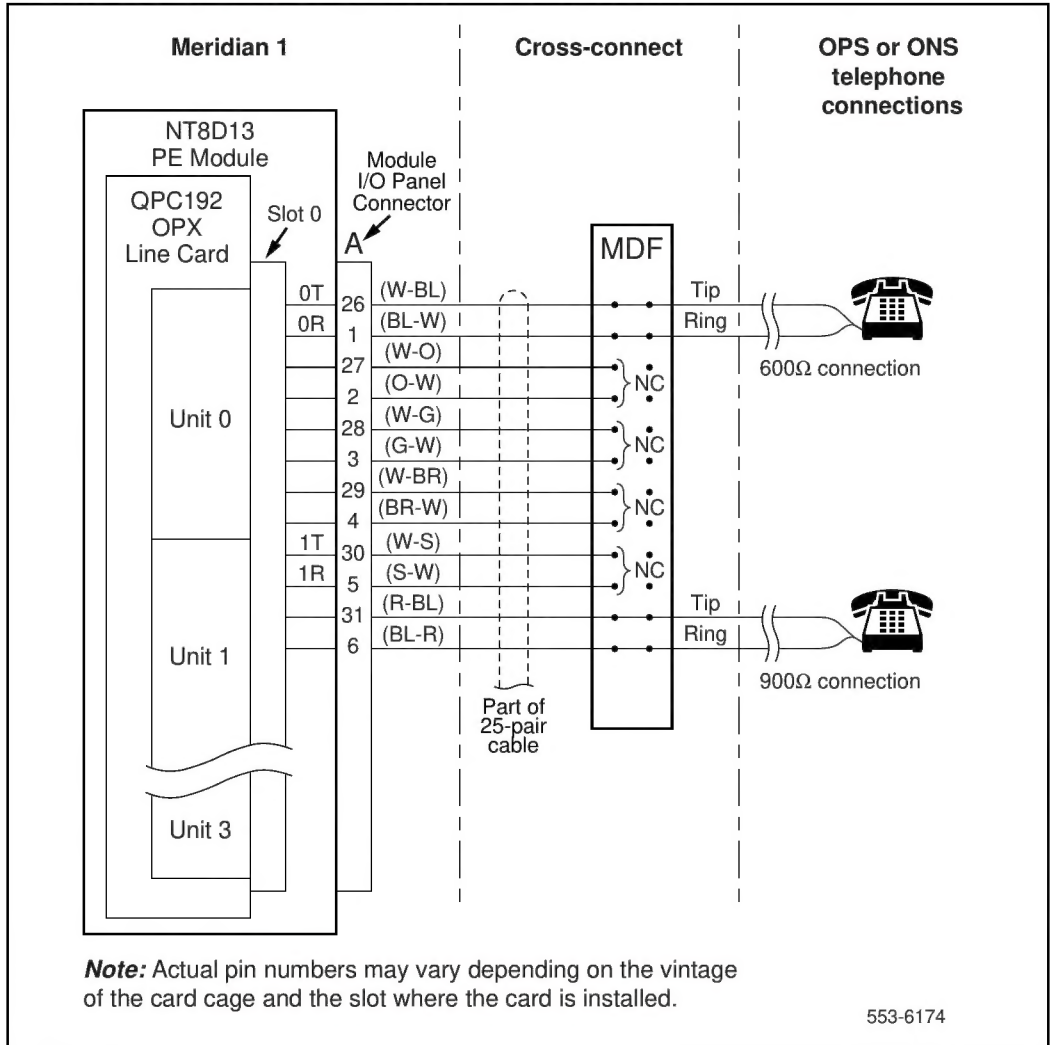
The OPX analog line card brings the four analog phone lines to the PE backplane through an 80-pin bus. In a PE shelf, the bus lines feed into seven multi-pin connectors that link the line cards to the main distribution frame (MDF), also called the cross-connect terminal. In the NT8D13 PE Module the backplane connector is cabled to the input/output (I/O) panel that is linked to the MDF through 25-pair cables.

Telephone lines from station equipment cross connect to the OPX analog line card at the MDF using a wiring plan similar to that used for trunk cards. A typical connection example is shown in [Figure 42](#), and a list of the connections to the analog line card are shown in [Table 48](#). See *Meridian 1 system installation procedures* (553-3001-210) for complete I/O panel information and wire assignments for each tip/ring pair.

Table 48
OPX analog line card—backplane pinouts

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
36A	Line 0, Tip (900 Ω)	38A	Line 0, Tip (600 Ω)	39A	Line 0, Ring (600 Ω)	37A	Line 0, Ring (900 Ω)
29A	Line 1, Tip (900 Ω)	31A	Line 1, Tip (600 Ω)	32A	Line 1, Ring (600 Ω)	30A	Line 1, Ring (900 Ω)
2A	Line 2, Tip (900 Ω)	4A	Line 2, Tip (600 Ω)	5A	Line 2, Ring (600 Ω)	3A	Line 2, Ring (900 Ω)
9A	Line 3, Tip (900 Ω)	11A	Line 3, Tip (600 Ω)	12A	Line 3, Ring (600 Ω)	10A	Line 3, Ring (900 Ω)

Figure 42
OPX analog line card—typical cross connection example



Configuration

This section outlines the procedures for configuring the switches and jumpers on the QPC192 Off-Premise Extension Analog Line Card and configuring the system software to properly recognize and configure the OPX line card.

[Figure 43](#) shows the location of the jumper blocks on this board.

Jumper strap settings

There are no user-configurable jumpers or switches on the OPX Line Card.

Software service changes

Individual line interface units on the OPX analog line card are enabled or disabled using the Single-line Telephone Administration program (LD 10). See the *X11 input/output guide* (553-3001-400) for LD 10 service change instructions.

Port-to-port loss configuration

The OPX analog line card provides transmission loss switching for control of end-to-end connection loss. Control of such loss is a major element in controlling transmission performance parameters such as received volume, echo, noise, and crosstalk. The loss plan for the OPX analog line card determines port-to-port loss between an OPX analog line card unit (port) and other Meridian 1 PE or IPE ports. LD 97 is used to configure the Meridian system for port-to-port loss. See the *X11 input/output guide* (553-3001-400) for LD 97 service change instructions.

Figure 43
OPX analog line card—jumper block locations

